

Muskmelon Variety Trial in Southwest Indiana — 2016

Wenjing Guan, Daniel S. Egel and Dennis Nowaskie, Southwest Purdue Agricultural Center, Vincennes, IN, 47591 guan40@purdue.edu

Indiana ranks fifth in 2015 in cantaloupe production in the United States. A total of 1,700 acres were harvested, with production about 272,000 cwt. The yield of cantaloupe per acre in Indiana decreased from 220 cwt in 2014 to 160 cwt in 2015, while the price per cwt increased from \$15.1 to \$28.0 (USDA, 2016a). Production value of cantaloupes in Indiana was about \$7.6 million in 2015, which accounted for about 14% of the value of fresh market vegetables in Indiana (USDA, 2016b). Cantaloupes grown in Indiana are primarily eastern types that form tan-colored netting and develop an identifiable abscission zone during ripening. Long-shelf life varieties that are recently introduced in the market are also tested in this variety trial.

Materials and Methods

Seed sources of the 12 cantaloupe varieties are provided in Table 1. Among them, ‘Durawest’, ‘Infinite Gold’, ‘NUN 26181’ and ‘NUN 26191’ are long shelf-life (LSL) cantaloupes. Seeds of all the varieties were planted into 50-cell black seeding flats (T.O. Plastics, Clearwater, MN) on 15 April 2015, using a peat-based potting media (Metro-Mix 360, a mixture of sphagnum peat moss, coarse perlite, bark ash, starter fertilizer and dolomite). Transplants were produced in a greenhouse at the Southwest Purdue Agricultural Center (SWPAC). Plants were transplanted to the field on 23 May 2015.

Soil type of the experimental site is Ade loamy fine sand. Previous crop (2015) was soybeans. Randomized complete block design with three blocks and 20 plants per variety per plot was used in the study. Plants were grown in raised beds covered with black plastic mulch. Drip tape with a 12-inch emitter spacing and flow rate of 0.22 gpm/100 ft was used for irrigation. Bed spacing and in-row spacing were 6 and 2.5 ft, respectively. Fertilizers at the rate of 250 lb/acre urea (46-0-0), 150 lb/acre potash (0-0-60), 100 lb/acre diammonium phosphate (18-46-0), 200 lb/acre dolomite lime, 100 lb/acre K-Mag granular, 7 lb/acre boron 14.3% and 20 lb/acre Zinc 10% LS were pre-plant broadcast applied. During transplanting, each plant received approximately one cup of starter fertilizer solution (Miracle-Gro, 4.7 grams per gallon water). Diseases and insects were managed using recommendations from Melcast (melcast.info) and *Midwest Vegetable Production Guide for Commercial Growers* (Egel et al., 2016).

Plants were harvested three times a week from 11 July to 5 Aug. Eastern-type cantaloupes were harvested at half to full slip stage. Fruit was weighted individually. Nine fully ripe fruit from each variety were collected during peak harvest for the evaluation of fruit quality attributes. Fruit size, seed cavity size, rind thickness, total soluble solids, flesh firmness were recorded. Data analysis of variance was performed using the Proc Mixed procedure of SAS. Fisher’s least significant difference test ($\alpha = 0.05$) was conducted for multiple comparisons of different measurements among cantaloupe varieties.

Results and Discussion

Eastern-type cantaloupe

Marketable yield of eastern-type muskmelon varieties ranged from 23,920 to 44,269 lb per acre. ‘ME3716’ yielded 44,269 lb/acre, significantly higher than other varieties except ‘Aphrodite’. ‘ME3716’ and ‘Athena’ produced the most marketable fruit (Table 2). ‘Sweet East’ and ‘Athena’ had the highest yield in the first week’s harvest. ‘Aphrodite’ and ‘ME3716’ had the highest yield in the fourth week’s harvest (Table 3 and Fig. 1). Average fruit size of eastern-type muskmelons ranged from 5.77 to 8.34 lb. ‘Aphrodite’ had the largest average fruit size (8.34 lb), followed by ‘Maxi East’ (8.28 lb), and ‘IM 183’ (7.95 lb), which had about 50% of the fruit larger than 8 lb (Table 4, Fig. 2).

‘Maxi East’ (12.02 °Brix) and ‘SV5196MF’ (12.3 °Brix) had significantly higher total soluble solids compared with other varieties. ‘SV5196MF’ had firmer flesh than other eastern-type muskmelons. Flesh firmness of eastern-type melons was less than 5 lbs-force except ‘SV5196MF’ and ‘Sweet East’ (Table 4). ‘Aphrodite’ had relatively large seed cavities, while seed cavities of ‘Athena’, ‘ME3743’, and ‘ME3716’ were smaller (Table 4).

Long shelf-life cantaloupe

The yield of LSL varieties ranged from 29,160 to 34,459 lb/acre, in the same range as eastern-type muskmelons. No significant differences in fruit weight were observed among varieties. Fruit number of ‘Durawest’ was less than other varieties (Table 5). Fruit size of LSL varieties was in the range of 3.97 to 6.67 lb, with ‘Durawest’ the largest and ‘NUN 2618’ the smallest (Table 6). Percentages of the number of fruit in weight categories are presented in Fig.3.

Total soluble solids of LSL varieties were similar among varieties, and they were all above 11 °Brix. The firmness of all the LSL varieties was above 5 lbs-force, with the values of ‘Infinite Gold’ and ‘Durawest’ significantly higher than ‘NUN 2618’ and ‘NUN 2619’.

Long shelf-life muskmelons last longer in the field. They can be harvested less frequently compared with eastern-type muskmelons. Because LSL muskmelons have delayed abscission and do not change color significantly, the same criteria for determining the ripeness of traditional eastern-type melons were not applied to the LSL muskmelons. Indicators used to determine the ripeness of LSL include a few vertical cracks form on the peduncle (the stem adjacent to the fruit) but fruit has not slipped yet. In addition, keeping track of days from direct sowing or transplanting is recommended to estimate the right harvest date. In this trial, we harvested ‘Infinite Gold’ and ‘Durawest’ about 10 days later than the first harvest of eastern-type muskmelons. LSL variety NUN 26181 and NUN 26191 change color from green to yellow before they are fully ripe. But the best quality fruit should be harvested when the rind turns dark yellow to almost orange.

Acknowledgements

The authors would like to thank Larry Sutterer, Bill Davis, Angie Thompson, Curtis Marchino, Barbara Joyner for their invaluable technical assistance with the variety trial, and the seed companies involved for their financial support.

Literature Cited

Egel, D., R. Foster, E. Maynard, R., et al. 2016. Midwest Vegetable Production Guide for Commercial Growers, 2015 (ID-56). Purdue University.

USDA, 2016a. National Agricultural Statistics Service. Vegetables 2015 Summary. 31 Oct.2016. <<http://usda.mannlib.cornell.edu/usda/current/VegeSumm/VegeSumm-02-04-2016.pdf>>.

USDA, 2016b. 2015 State Agriculture Overview, Indiana. 31 Oct.2016. <https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=INDIANA>.

Table 1. Varieties and seed sources of muskmelon varieties in the 2016 muskmelon variety trial in southwest Indiana.

Variety	Seed company	Notes^z
Aphrodite	Syngenta	
Athena	Syngenta	
Durawest	Nunhems/Bayer	LSL
IM 183	Clifton	
Infinite Gold	Sakata	LSL
Maxi East	Nunhems/Bayer	
ME3716 (Astound)	Syngenta	
ME3743 (Accolade)	Syngenta	
NUN 26181	Nunhems/Bayer	LSL
NUN 26191	Nunhems/Bayer	LSL
SV5196MF	Seminis	
Sweet East	Nunhems/Bayer	

^zLSL: long shelf-life type muskmelons

Table 2. Marketable and total yields of eastern-type muskmelon varieties in the 2016 muskmelon variety trial in southwest Indiana.

Variety	Marketable yield				Total yield			
	<i>Weight (lb) per acre</i>		Number of fruit per acre		<i>Weight (lb) per acre</i>		<i>Number of fruit per acre</i>	
Aphrodite	43,068	ab	5,179	cd	49,280 a	6,098	bc	
Athena	34,728	bc	6,001	ab	42,463 a	7,550	ab	
Maxi East	31,229	cd	3,775	d	41,523 a	5,324	c	
ME3743	34,062	bc	5,420	bc	42,746 a	7,212	ab	
ME3716	44,269	a	7,066	a	50,849 a	8,615	a	
IM 183	28,769	cd	3,630	d	45,145 a	5,856	bc	
SV5196MF	23,920	d	3,872	d	28,393 a	4,792	c	
Sweet East	33,204	cd	4,453	cd	40,792 a	5,856	bc	

^zMeans within a column followed by the same letter are not significantly different according to Fisher's least significant difference test at $P \leq 0.05$.

Table 3. Yields of eastern-type muskmelon varieties harvested in each week in the 2016 muskmelon variety trial in southwest Indiana.

Variety	First week				Second week				Third week				Fourth week			
	Weight (lb) per acre		Number of fruit per acre		Weight (lb) per acre		Number of fruit per acre		Weight (lb) per acre		Number of fruit per acre		Weight (lb) per acre		Number of fruit per acre	
Aphrodite	609	c ^z	97	b	16,841	a	2,081	ab	15,023	ab	1,694	bc	10,595	a	1,307	ab
Athena	2,980	a	677	a	14,927	a	2,614	ab	9,806	bc	1,549	bc	7,015	ab	1,162	abc
Maxi East	914	bc	193	b	4,689	b	629	c	18,513	a	2,081	ab	7,113	ab	871	bcde
ME3743	2,450	ab	532	a	13,863	a	2,275	ab	11,868	abc	1,646	bc	5,881	bc	968	abcd
ME3716	445	c	97	b	15,932	a	2,662	a	17,615	a	2,710	a	10,276	a	1,597	a
IM 183	1,366	bc	242	b	12,056	ab	1,549	bc	12,825	abc	1,452	bc	2,523	c	387	de
SV5196MF	163	c	48	b	11,578	ab	1,984	ab	8,104	c	1,210	c	4,074	bc	629	cde
Sweet East	2,994	a	581	a	12,812	a	1,597	abc	15,508	ab	2,033	abc	1,889	c	242	e

^zMeans within a column followed by the same letter are not significantly different according to Fisher's least significant difference test at $P \leq 0.05$.

Table 4. Fruit quality of eastern-type muskmelon varieties in the 2016 muskmelon variety trial in southwest Indiana.

Variety	Average fruit size (lb)		Total soluble solids (°Brix)		Firmness (lbs-force)		Rind (in)		Fruit length (in)		Fruit width (in)		Seed cavity length (in)		Seed cavity width (in)	
Aphrodite	8.34	a	9.82	b	3.39	d	0.36	b	7.93	bc	7.72	ab	5.21	ab	4.14	a
Athena	5.77	c	9.92	b	3.64	cd	0.45	a	7.65	cd	6.88	c	4.72	c	3.03	bc
Maxi East	8.28	a	12.02	a	4.46	bcd	0.35	b	8.41	ab	7.33	bc	5.35	a	3.21	bc
ME3743	6.27	c	10.23	b	4.97	bc	0.49	a	7.63	cd	6.95	c	4.47	c	3.27	bc
ME3716	6.22	c	9.65	b	4.88	bc	0.48	a	7.23	d	6.71	c	4.40	c	2.61	c
IM 183	7.95	ab	9.15	b	4.19	bcd	0.38	b	8.44	ab	8.07	a	5.20	ab	3.48	ab
SV5196MF	6.17	c	12.3	a	7.41	a	0.29	c	7.64	cd	6.84	c	4.81	bc	2.64	bc
Sweet East	7.44	b	10.2	b	5.63	b	0.36	b	8.75	a	7.36	abc	5.32	a	2.80	bc

^zMeans within a column followed by the same letter are not significantly different according to Fisher's least significant difference test at $P \leq 0.05$.

Table 5. Marketable and total yields of long shelf-life muskmelon varieties in the 2016 muskmelon variety trial in southwest Indiana.

Variety	Marketable yield			Total yield		
	<i>Weight (lb) per acre</i>	<i>Number of fruit per acre</i>		<i>Weight (lb) per acre</i>	<i>Number of fruit per acre</i>	
Infinite Gold	34,459 a	6,292	b	38,159 a	7,018	b
Nun 26181	33,344 a	8,373	a	37,600 a	9,486	a
Nun 26191	32,217 a	6,147	b	38,665 a	7,454	b
Durawest	29,160 a	4,404	c	31,669 a	4,888	c

^zMeans within a column followed by the same letter are not significantly different according to Fisher's least significant difference test at $P \leq 0.05$.

Table 6. Fruit quality of long shelf-life muskmelon varieties in the 2016 muskmelon variety trial in southwest Indiana.

Variety	Average fruit size (lb)		Total soluble solids (°Brix)		Firmness (lbs-force)		Rind (in)		Fruit length (in)		Fruit width (in)		Seed cavity length (in)		Seed cavity width (in)	
Infinite Gold	5.52	b ^z	12.23	a	8.37	a	0.30	a	7.42	a	6.43	b	4.82	a	2.80	a
Nun 26181	3.97	c	11.17	a	5.37	b	0.33	a	8.31	a	5.68	c	3.96	b	1.94	c
Nun 26191	5.23	b	11.97	a	5.38	b	0.38	a	6.96	a	6.36	b	4.26	b	2.14	b
Durawest	6.67	a	11.90	a	7.54	a	0.19	b	8.12	a	6.99	a	5.28	a	2.68	a

^z Means within a column followed by the same letter are not significantly different according to Fisher's least significant difference test at $P \leq 0.05$.

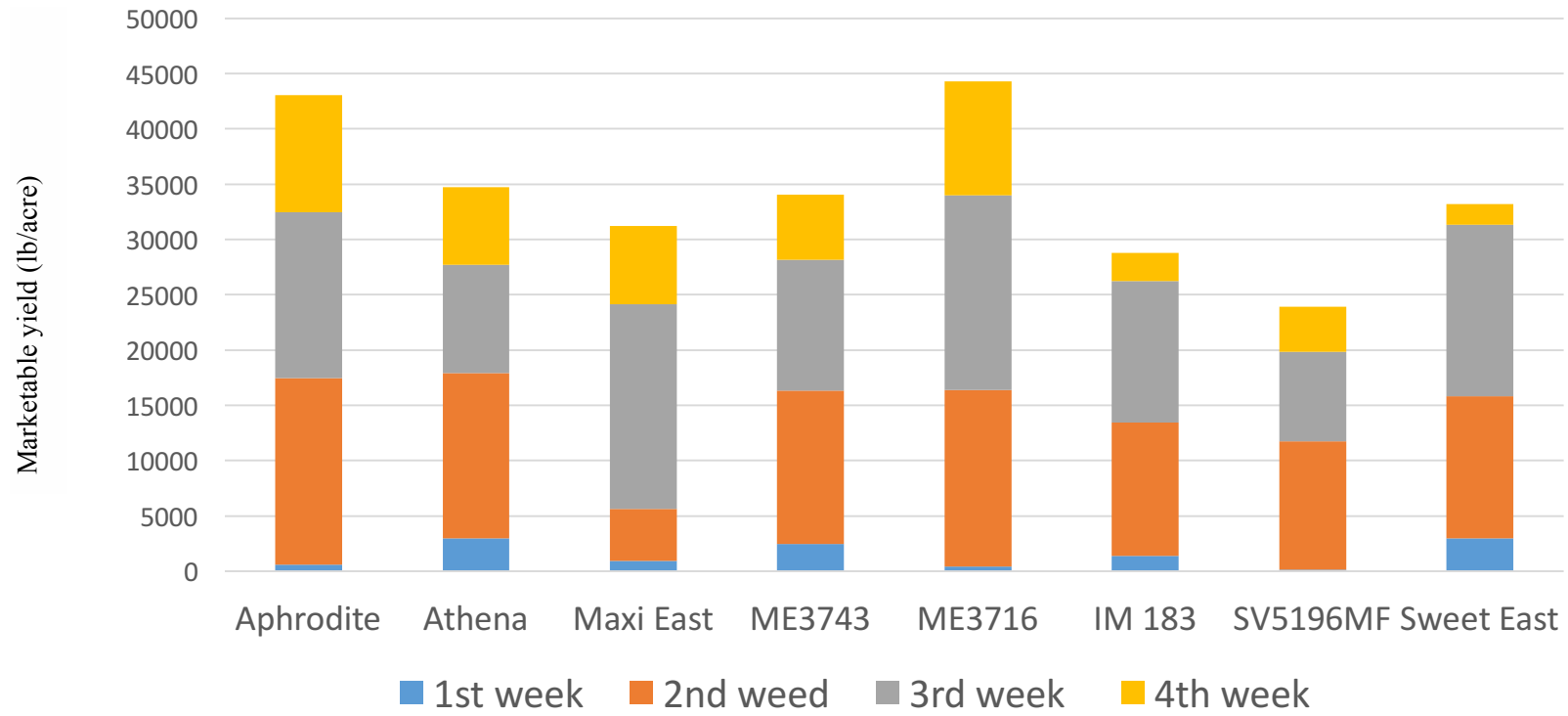


Figure 1. Yield of eastern-type cantaloupes harvested in each week in the 2016 cantaloupe variety trial in southwest Indiana.

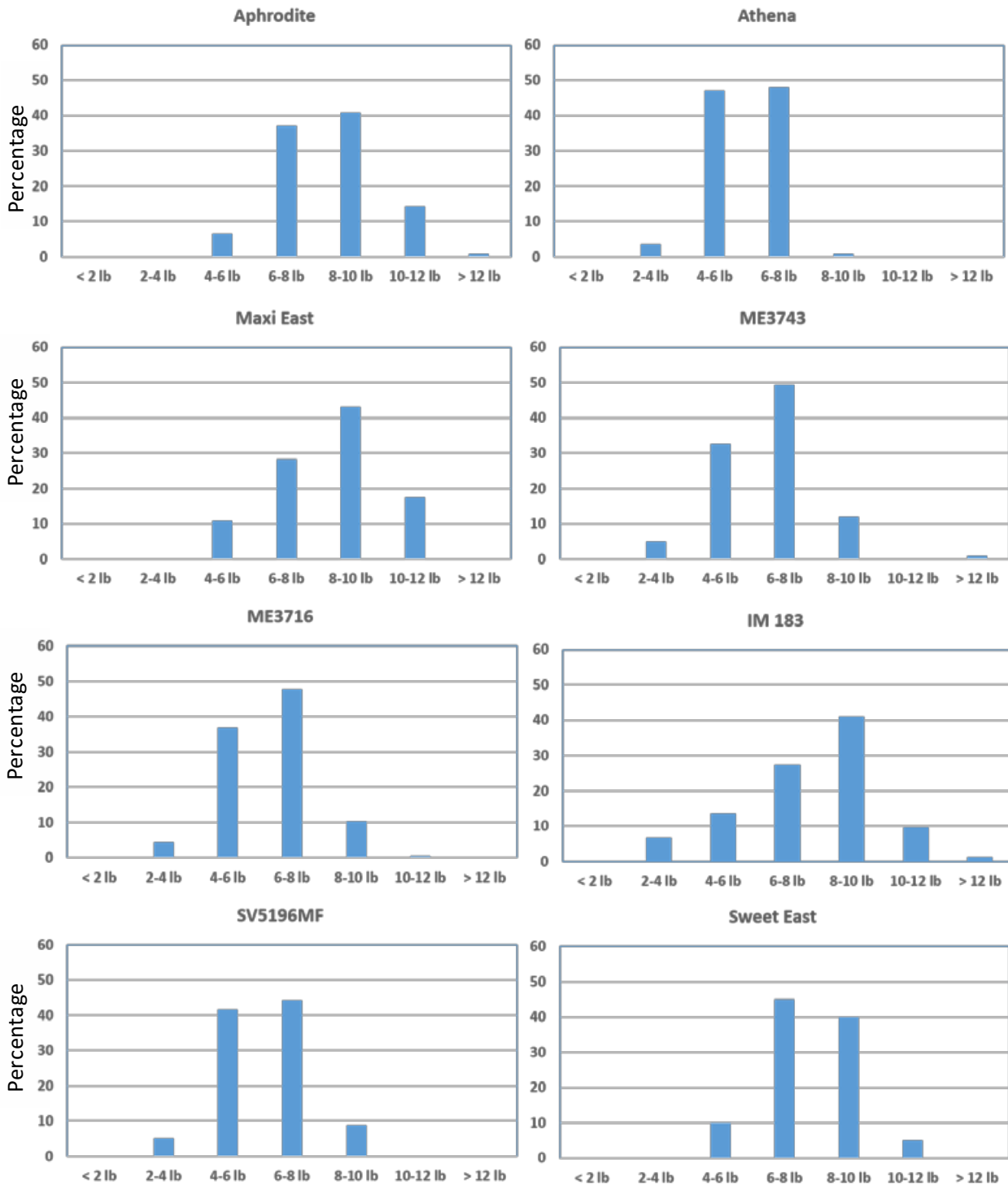


Figure 2. Percentages of the number of eastern-type muskmelons in each weight category in the 2016 muskmelon variety trial in southwest Indiana.

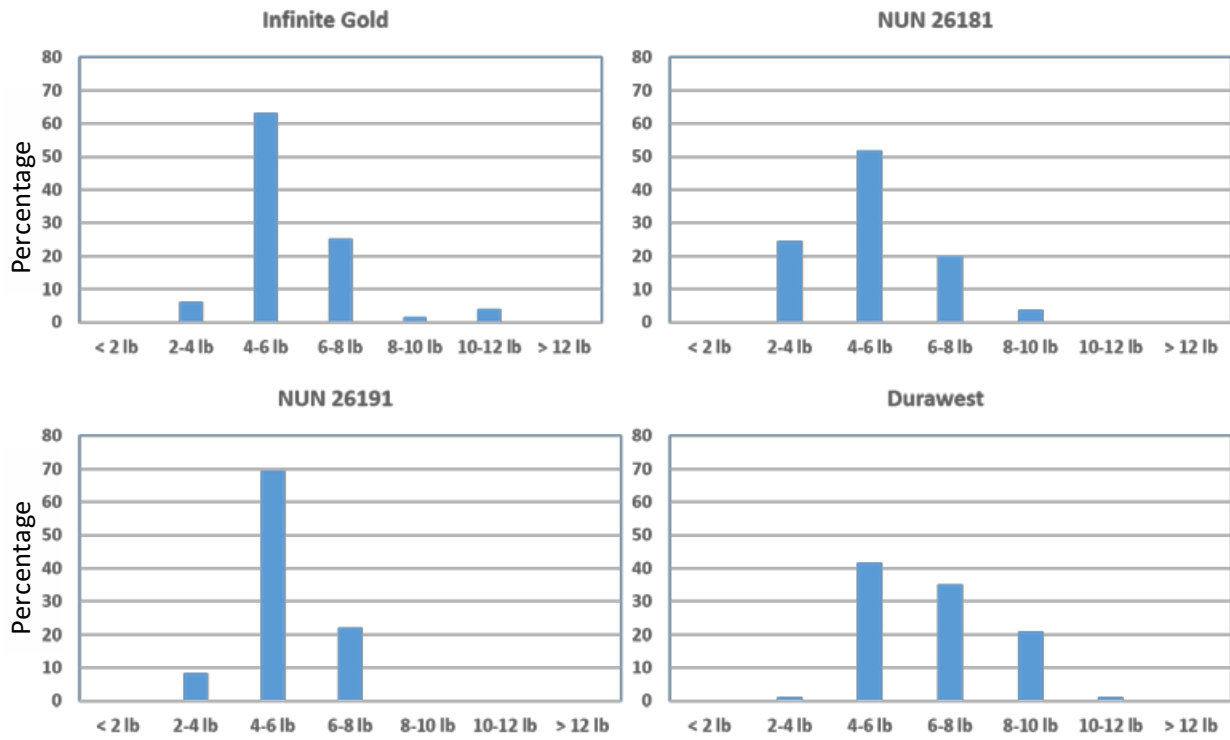


Figure 3. Percentages of the number of long shelf-life muskmelons in each weight category in the 2016 muskmelon variety trial in southwest Indiana.

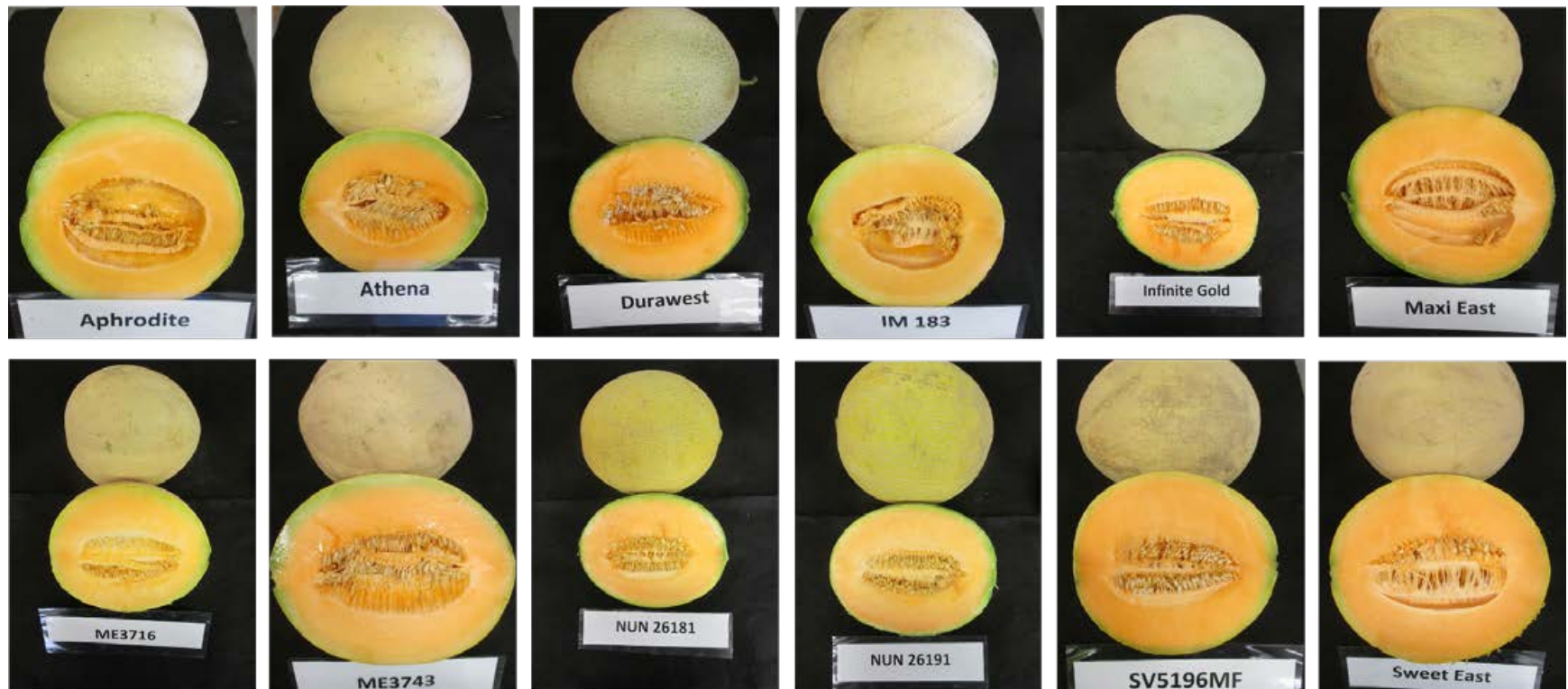


Figure 4. Exterior and interior of muskmelon varieties in the 2016 muskmelon variety trial in southwest Indiana.